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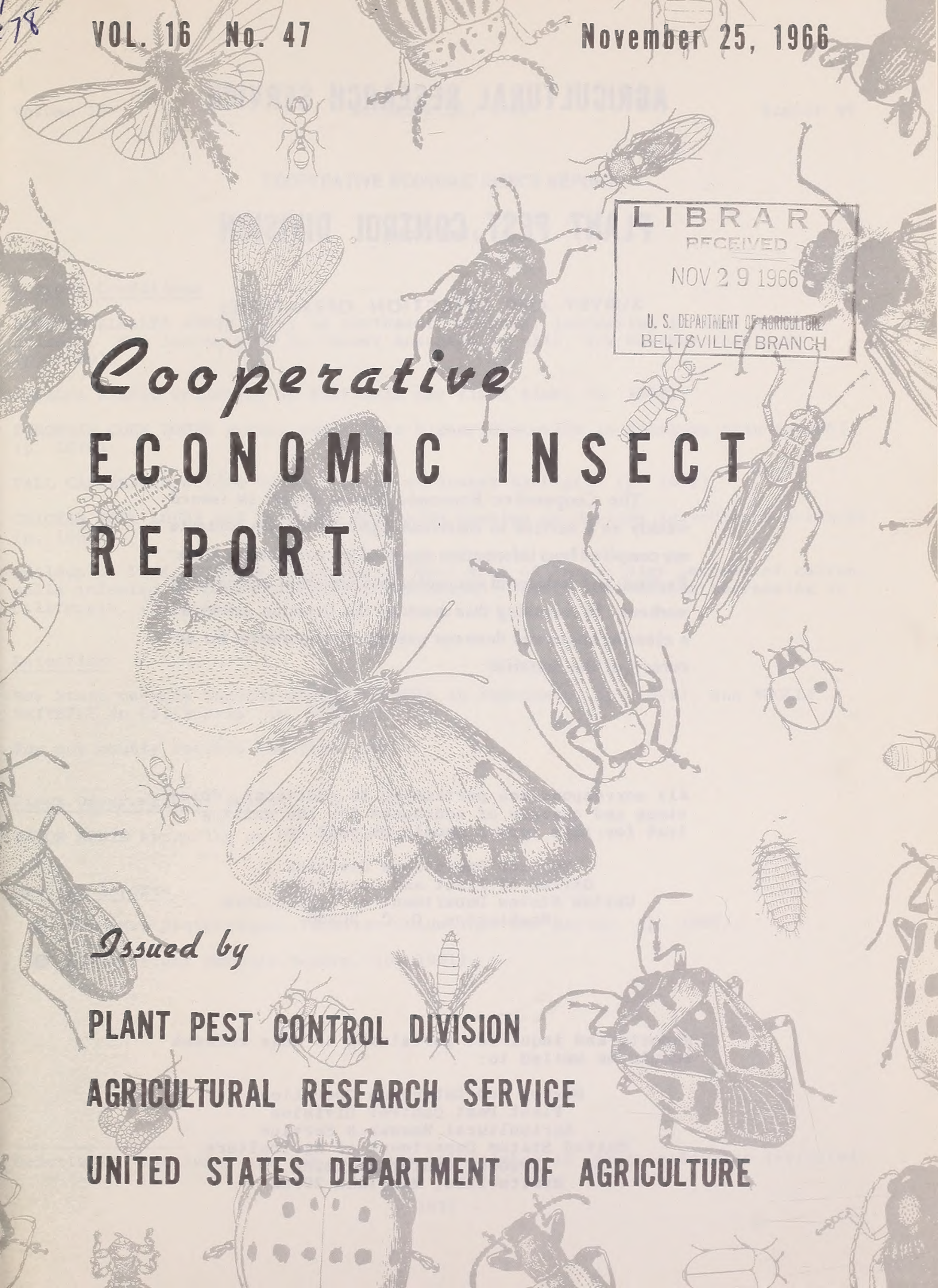

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Cooperative
ECONOMIC INSECT REPORT

Issued by

PLANT PEST CONTROL DIVISION
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL DIVISION

SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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Volume 16 November 25, 1966 Number 47

COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

Current Conditions

SPOTTED ALFALFA APHID heavy in northeast Oklahoma; increasing in Yuma County, Arizona. May increase in northwest Arkansas if mild, dry weather continues. (p. 1079).

ALFALFA WEEVIL collected in Wisconsin for first time. (p. 1079).

EUROPEAN CORN BORER larval population higher Statewide in Nebraska than in 1965. (p. 1079).

FALL CANKERWORM active and mating in southeast Michigan. (p. 1082).

CHICKEN BODY LOUSE and NORTHERN FOWL MITE problem on poultry in northern Arkansas. (p. 1083).

Buildup of PINK BOLLWORM indicated in Waco area of Texas; high percent of cotton bolls infested in Dona Ana County, New Mexico. Adult collections decreasing in California. (p. 1084).

Detection

New State records include ALFALFA WEEVIL in Wisconsin, (p. 1079), and WOOLLY WHITEFLY in California (p. 1081).

For new county records see page 1085.

First Occurrence of Season

MELON APHID appearing on citrus in California. (p. 1081).

Special Reports

- Formosan Subterranean Termite: Guidelines for Survey. (p. 1087).
- Key to Eight Termite Genera. (p. 1091).

Reports in this issue are for week ending November 18 unless otherwise indicated.

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WEATHER OF THE WEEK ENDING NOVEMBER 21, 1966

HIGHLIGHTS: Warm, dry weather prevailed over most of the Nation. Rain fell daily along the central and northern Pacific coast. High pressure and warm air persisted over the Rockies confining major storminess to the west coast.

PRECIPITATION: Most areas from the southwestern deserts to the middle and southern Atlantic coast and from the Dakotas to Mexico and the gulf received no rain or only widely scattered, very light showers in the past week. Measurable amounts fell at a number of stations from the Ozark Mountains in Missouri to Louisiana and Mississippi. One area in Louisiana received more than 4 inches in a locally heavy shower. A few heavy showers also fell in southeastern Florida. Precipitation was frequent but light from the Great Lakes to New England. A low-pressure area, stalled off the Washington coast since the previous week, brought rains every day along the northern and central Pacific coast. Weekly totals ranged from about 1 inch in the Puget Sound area to about 16 inches in the Mendocino, California, vicinity, to less than 0.5 inch south of San Francisco.

SNOWFALL: Snow accumulated seasonally at higher elevations near the west coast but was lighter in the Cascades and absent from the Rockies. At midweek, light snows accumulating to as much as 2 to 4 inches in local areas fell in the upper Great Lakes region, upper New York, and northern New England.

Weather continued on page 1083.

SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

SPOTTED ALFALFA APHID (Therioaphis maculata) - VIRGINIA - Light, 5 per 10 sweeps on alfalfa in Alleghany County. (Isakson). ARKANSAS - Little change, 100-200 per 100 sweeps in northwest area; may increase if mild, dry weather continues. (Boyer). OKLAHOMA - Ranged 50-65 per 10 sweeps on alfalfa in Rogers and Washington Counties. Averaged 225 per square foot in fall-seeded alfalfa in Tulsa County. Building up in scattered areas of Major County. (Okla. Coop. Sur.). NEW MEXICO - Light in all alfalfa fields checked. (N. M. Coop. Rpt.). ARIZONA - Increasing in alfalfa fields in Yuma and Gila Valleys, Yuma County; decreasing in Maricopa County fields. (Ariz. Coop. Sur.).

CORN LEAF APHID (Rhopalosiphum maidis) - NEW MEXICO - Medium on barley in Dona Ana County. (Campbell).

GREENBUG (Schizaphis graminum) - OKLAHOMA - Ranged 0-6, average 2 or less, per linear foot on wheat in northeast area. (Okla. Coop. Sur.).

CORN, SORGHUM, SUGARCANE

EUROPEAN CORN BORER (Ostrinia nubilalis) - NEBRASKA - State average 68 percent plants infested and 130 borers per 100 stalks. Statewide average higher than last year. (Rhine).

APPLE GRAIN APHID (Rhopalosiphum fitchii) - ARIZONA - Heavy in many Yuma County sorghum fields; however, buildup probably too late to cause economic loss to rapidly maturing sorghum. (Ariz. Coop. Sur.).

SMALL GRAINS

ENGLISH GRAIN APHID (Macrosiphum avenae) - OKLAHOMA - Ranged 0-7 per linear foot on oats in Craig and Ottawa Counties; 0-3 per linear foot on wheat in northeast area. (Okla. Coop. Sur.). ARKANSAS - Low, 75-100 per 100 sweeps on wheat in northwest area. (Boyer).

TARNISHED PLANT BUG (Lygus lineolaris) - OKLAHOMA - Present in most wheat fields in northeast area; up to 2 per linear foot. (Okla. Coop. Sur.).

TURF, PASTURES, RANGELAND

A SPITTLEBUG (Prosapia bicincta) - FLORIDA - Populations rapidly declining at Belle Glade, Palm Beach County. (Genung).

BLUEGRASS BILLBUG (Sphenophorus parvulus) - NEBRASKA - Damaged bluegrass in Lincoln, Lancaster County, during summer. This new county record. (Roselle, Rhine).

A SNAIL (Vallonia pulchella) - CALIFORNIA - Locally heavy in dichondra lawn at Garden Grove, Orange County. (Cal. Coop. Rpt.).

FORAGE LEGUMES

ALFALFA WEEVIL (Hypera postica) - WISCONSIN - Collected from alfalfa near Tobin, Kenosha County, November 15, 1966, by M. S. Conrad and O. L. Lovett. Det. by R. E. Warner. New State record. (Wis. Ins. Sur.). MICHIGAN - Adult taken in 2,000-sweep sample from Branch County alfalfa field November 17. New county record. Three adults taken from Livingston County alfalfa field. This second infestation found in Livingston County. (Holton et al.). MASSACHUSETTS - Surveys in Berkshire County indicate 0-2 adults and 3-23 larvae per 100 sweeps. Damage noticeable in few fields. (Miller, Oct. 14). VIRGINIA - Adults averaged 7 per sweep in Alleghany County field. Ranged 3-6 per 10 sweeps in other Alleghany, Botetourt and Roanoke County fields; larvae 2-6 per 10 sweeps. (Isakson). MISSISSIPPI - Light infestation found in Oktibbeha County alfalfa, 1-2 larvae per square foot in most areas. Infestation noneconomic. (Dinkins).

CLOVER LEAF WEEVIL (Hypera punctata) - MICHIGAN - Collected 116 adults from 2 Livingston County alfalfa fields. (Cooper et al.).

CLOVER ROOT CURCULIO (Sitona hispidula) - WISCONSIN - This and clover leaf weevil common in most Kenosha County fields checked. Averaged 500 per 2,000 sweeps. (Wis. Ins. Sur.).

SOUTHERN CORN ROOTWORM (Diabrotica undecimpunctata howardi) - VIRGINIA - Averaged 1 per 30 sweeps on alfalfa in Alleghany, Botetourt and Roanoke Counties. (Isakson). MICHIGAN - Total of 5 adults taken in 2,000-sweep sample from 2 Livingston County alfalfa fields. (Newman).

A CUTWORM (Feltia ducens) - WISCONSIN - Larvae common in several Kenosha County alfalfa fields. (Wis. Ins. Sur.).

PEA APHID (Acyrthosiphon pisum) - NEW MEXICO - Damaging young alfalfa in Chaves County. (Mathews). OKLAHOMA - Ranged 30-45 per 10 sweeps on alfalfa in Rogers and Washington Counties. Averaged 12 per square foot in fall-seeded alfalfa in Tulsa County. (Okla. Coop. Sur.). ARKANSAS - Remains low in legumes in northwest area; may continue low with warm, dry weather. (Boyer). MISSISSIPPI - Moderate on alfalfa in Oktibbeha County. (Dinkins). VIRGINIA - Light, 5-20 per sweep on alfalfa in Alleghany and Botetourt Counties. (Isakson). MICHIGAN - Greatly reduced on alfalfa during past 2 weeks; alfalfa foliage has dried and turned brown. (Dowdy).

LYGUS BUGS (Lygus spp.) - VIRGINIA - Ranged 2-5 per 10 sweeps on alfalfa in Alleghany, Botetourt and Roanoke Counties. (Isakson). OKLAHOMA - L. lineolaris averaged 53 per 10 sweeps on alfalfa in Washington County and 14 per 10 sweeps in Rogers County. (Okla. Coop. Sur.).

THREE-CORNERED ALFALFA HOPPER (Spissistilus festinus) - ARIZONA - Continues to damage alfalfa in Graham, Pinal, Maricopa and Yuma Counties. (Ariz. Coop. Sur.).

COTTON

BOLL WEEVIL (Anthonomus grandis) - ALABAMA - Dead larvae and pupae observed in dying cotton bolls resulting from 26 degree temperature November 2 in Lee County. Live adults observed in same fields. (Mott et al.).

For Boll Weevil in Texas and Boll Weevil Complex in Arizona and California, see page 1084.

COTTON APHID (Aphis gossypii) - CALIFORNIA - Medium on cotton in Fresno, Fresno County. (Cal. Coop. Rpt.).

COLE CROPS

BLACK CUTWORM (Agrotis ipsilon) - FLORIDA - This and granulate cutworm larvae heavy on untreated cabbage at Belle Glade, Palm Beach County. (Genung).

TURNIP APHID (Hyadaphis pseudobrassicae) - OKLAHOMA - Up to 500 per leaf on commercial turnips in Bixby area of Tulsa County; up to 300 per leaf in home garden turnips in Mayes County. (Okla. Coop. Sur.).

GENERAL VEGETABLES

CABBAGE LOOPER (Trichoplusia ni) - ARIZONA - Decreased in lettuce fields of Yuma and Maricopa Counties; control efforts continue. (Ariz. Coop. Sur.).

CELERY LEAF TIER (Udea rubigalis) - ARIZONA - Light on lettuce in Yuma County; one field required control. (Ariz. Coop. Sur.).

DECIDUOUS FRUITS AND NUTS

HICKORY SHUCKWORM (Laspeyresia caryana) - ALABAMA - Numerous larvae in shucks of pecan and hickory nuts on ground in Lee and other counties. (McQueen).

PECAN WEEVIL (Curculio caryae) - OKLAHOMA - Continues active on pecans in Mayes County. (Okla. Coop. Sur.).

A FALSE POWDER-POST BEETLE (Xylobiops basilaris) - ALABAMA - Adults heavy on large pecan orchard in Barbour County; infesting limbs hanging in trees from breakage earlier in year. Few observed in healthy branches. (Hagler).

APPLE MAGGOT (Rhagoletis pomonella) - MARYLAND - Collected from apricot September 15, 1966, in Prince Georges County; this is new host record. Det. by R. H. Foote. (Gentry).

CITRUS

Citrus Insect Situation in Florida - Mid-November - CITRUS RUST MITE (Phyllocoptruta oleivora) infested 67 percent of groves (norm 65 percent); 51 percent economic (norm 49 percent). Populations near normal and decreasing but still in high range. Although further decrease expected, about 20 percent of groves will have heavy infestations. Highest districts south, west and north. CITRUS RED MITE (Panonychus citri) infested 39 percent of groves (norm 38 percent); 13 percent economic (norm 12 percent). Population near normal and in moderate range; little change expected. Highest districts north and west. TEXAS CITRUS MITE (Eutetranychus banksi) infested 22 percent of groves (norm 40 percent); 5 percent economic (norm 16 percent). Continues below average and in low range; population will remain low in all districts. Highest district north. YELLOW SCALE (Aonidiella citrina) infested 63 percent of groves; 16 percent economic. Population decreased to moderate range but will continue higher than normal for November. Highest districts east, central and south. GLOVER SCALE (Lepidosaphes gloverii) infested 60 percent of groves; 15 percent economic. Population slightly above normal and in moderate range; decrease expected. Highest districts central and east. PURPLE SCALE (L. beckii) normal; low to moderate range; decreasing. CHAFF SCALE (Parlatoria pergandii) below normal; low range; little change. BLACK SCALE (Saissetia oleae) below normal; low range; little change. WHITEFLY population below normal; low range; decrease expected. (W. A. Simanton, (Citrus Expt. Sta., Lake Alfred)).

WOOLLY WHITEFLY (Aleurothrixus floccosus) - CALIFORNIA - Locally heavy on citrus in San Diego, San Diego County. This is first record in State. Coll. by J. H. Rosenberger, November 9. Det. by R. F. Wilkey. (Cal. Coop. Rpt.).

COWPEA APHID (Aphis craccivora) - ARIZONA - Moderate, damaging terminals of citrus and peach trees in Yuma County. (Ariz. Coop. Sur.).

MELON APHID (Aphis gossypii) - CALIFORNIA - This and winged adults of rusty plum aphid light in 20 acres of citrus at Reedley, Fresno County. This early date for citrus to be infested with melon aphid. (Cal. Coop. Rpt.).

OTHER TROP. & SUBTROP. FRUITS

OLIVE SCALE (Parlatoria oleae) - CALIFORNIA - Medium on olive trees in Redding. This is first record for Shasta County. (Cal. Coop. Rpt.).

ORNAMENTALS

A BARK BEETLE (Xylosandrus compactus) - FLORIDA - Larvae, pupae and adults infesting dogwood at Gainesville, Alachua County. (Weber).

POTATO PSYLLID (Paratrioza cockerelli) - CALIFORNIA - Medium on Jerusalem-cherry nursery stock at Paradise, Butte County. (Cal. Coop. Rpt.).

WOOLLY APPLE APHID (Eriosoma lanigerum) - NEW MEXICO - Medium to heavy on ornamental apple trees in downtown Albuquerque, Bernalillo County. (Heninger).

PAINTED MAPLE APHID (Drepanaphis acerifoliae) - CALIFORNIA - Nymphs and adults medium on silver maple nursery stock in Selma, Fresno County. (Cal. Coop. Rpt.).

GREENHOUSE WHITEFLY (Trialeurodes vaporariorum) - CALIFORNIA - Medium on locust nursery stock in Colma, San Mateo County. (Cal. Coop. Rpt.).

A PIT SCALE (Asterolecanium puteanum) - MARYLAND - Heavily infesting several American holly trees at Salisbury, Wicomico County. (U. Md., Ent. Dept.).

BROWN SOFT SCALE (Coccus hesperidum) - CALIFORNIA - Heavy populations infesting cedar nursery stock in San Jose, Santa Clara County. (Cal. Coop. Rpt.).

ARMORED SCALES - NEW MEXICO - Phenascaspis pinifoliae medium to heavy on ponderosa and piñon pines in ornamental plantings at shopping centers in Albuquerque, Bernalillo County. (Heninger). FLORIDA - Adults of Pseudaulacaspis pentagona severely infesting 45 golden-rain trees in nursery at Plant City, Hillsborough County. (Vaughn).

YUCCA PLANT BUG (Halticotoma valida) - ALABAMA - Heavy on yucca in nursery near Florala, Covington County. (Dean, Stevenson).

LARGE MILKWEED BUG (Oncopeltus fasciatus) - CALIFORNIA - Nymphs heavy on jasmine in Santa Barbara, Santa Barbara County. (Cal. Coop. Rpt.).

A SPIDER MITE (Oligonychus milleri) - CALIFORNIA - Medium on pine tree nursery stock in Fresno, Fresno County. (Cal. Coop. Rpt.).

FOREST AND SHADE TREES

RED-HEADED PINE SAWFLY (Neodiprion lecontei) - VIRGINIA - Larvae feeding on Scotch pine at Blacksburg, Montgomery County. (Amos, Isakson).

TWIG GIRDLER (Oncideres cingulata) - ALABAMA - Heavy girdling causing breakage of small limbs in isolated persimmon and hickory trees in Jackson, Marshall and De Kalb Counties. (McQueen).

MIMOSA WEBWORM (Homadaula albizziae) - ILLINOIS - Collected from locust at Deerfield, Lake County, November 18, 1966, by F. R. Walker. Det. by W. E. LaBerge. New county record. (White).

FALL CANKERWORM (Alsophila pometaria) - MICHIGAN - Adults active and mating in Ingham and Wayne Counties during recent warm evenings. (Hoffman).

MAN AND ANIMALS

CHICKEN BODY LOUSE (*Menacanthus stramineus*) - ARKANSAS - Problem on turkeys in Cleburne County. Brought under control with treatment. (Roberts).

NORTHERN FOWL MITE (*Ornithonyssus sylviarum*) - ARKANSAS - Increasing; medium in some northwest area flocks. (Simco).

BLACK-LEGGED TICK (*Ixodes scapularis*) - OKLAHOMA - Collected on dogs in Mayes County. (Okla. Coop. Sur.).

MOSQUITOES - FLORIDA - Collections of freshwater species much higher than saltmarsh species during early November from light traps in Indian River County. Trend expected downward, provided no high tides, rain, or grove irrigation. (Fla. Coop. Sur.). LOUISIANA - Larval collections in Jefferson Parish contained: *Anopheles quadrimaculatus*, *Culex pipiens quinquefasciatus*, *C. salinarius*, and *Culiseta inornata*. Light trap collections averaged 17.2 mosquitoes per night with 20 light traps operated throughout the parish. Dominant species, *Culex salinarius* and *Culiseta inornata*. (Stokes).

HORN FLY (*Haematobia irritans*) - MISSISSIPPI - Ranged 10-15 per animal in Oktibbeha and Lowndes Counties. (Dinkins). OKLAHOMA - Light, 5 per head, on dairy cows in Mayes County. (Okla. Coop. Sur.).

SCREW-WORM (*Cochliomyia hominivorax*) - Total of 70 cases reported in U. S. November 13-19 as follows: TEXAS - Hudspeth 1, Presidio 4, Brewster 2, Val Verde 1, Kinney 3, Maverick 6, Zavala 1, Dimmit 4, La Salle 2, Jim Hogg 2, Starr 2, Willacy 2, Cameron 2, Blanco 1, Lee 1, Webb 1, Uvalde 1, Reeves 1. ARIZONA - Maricopa 11, Yuma 3, Gila 1, Graham 1, Pinal 1, Mohave 3. CALIFORNIA - Imperial 13. Total of 297 cases reported in portion of Barrier Zone in Republic of Mexico as follows: Territorio sur de Baja California 24, Sonora 155, Chihuahua 47, Coahuila 41, Nuevo Leon 22, Tamaulipas 8. No cases were reported from Mexico south of the Barrier Zone. Barrier Zone is area where eradication operations underway to prevent establishemnt of self-sustaining population in U. S. Sterile screw-worm flies released: Texas 47,590,250, New Mexico 2,704,000, Arizona 14,456,000, California 1,716,000, Mexico 54,140,000. (Anim. Health Div.).

Weather continued from page 1078.

TEMPERATURE: Bright, sunny skies and light southerly winds kept temperatures above normal over most of the Nation. Some areas in the Great Basin and western Great Plains averaged more than 10° above normal. Afternoon temperatures climbed to the 70's in the southern parts of Illinois and Indiana at midweek and to the 60's over parts of Montana over the weekend. Temperatures dropped to near zero over northern Montana and northwestern North Dakota on Thursday morning. Weekly mean temperatures were generally below normal from the Continental Divide in Montana to northern Minnesota; also, from New York to South Carolina and northeastward to New England. (Summary supplied by Environmental Data Service, ESSA).

HOUSEHOLDS AND STRUCTURES

BROWN-BANDED COCKROACH (Supella supellectilium) - CALIFORNIA - Medium in apartment house at Marysville, Yuba County; more numberous this fall than usual, probably due to continued warm weather. (Cal. Coop. Rpt.).

CIGARETTE BEETLE (Lasioderma serricorne) - ALABAMA - Annoying in several homes in Mobile and Madison Counties. (Watford, Hood).

A SOLDIER BEETLE (Chauliognathus sp.) - VIRGINIA - Larvae abundant and entering homes in Prince Edward and Westmoreland Counties. (Isakson et al.).

STORED PRODUCTS

ANGOUMOIS GRAIN MOTH (Sitotroga cerealella) - MARYLAND - Building up in stored corn near Quantico, Wicomico County. (U. Md., Ent. Dept.).

FEDERAL & STATE PLANT PROTECTION PROGRAMS

PINK BOLLWORM (Pectinophora gossypiella) - CALIFORNIA - Moth collections decreased; results of treatment evident in areas where regular applications made. With advent of seasonal rains and local frosts in some areas, growing plants reduced. Cotton harvest well underway in San Joaquin Valley. (Cal. Coop. Rpt.). NEW MEXICO - Boll checks at Las Cruces, Dona Ana County, reveal 75-80 percent of bolls infested with larvae. (Campbell). TEXAS - Lint cleaner inspections in Waco district indicate steady population buildup; commercial damage evident in El Paso area. Larvae per bale averaged 10 in Waco district, 12 in Pecos area, as shown by lint cleaner inspections. (PPC South. Reg., Oct. Rpt.). OKLAHOMA - Lint cleaner inspections positive in Beckham, Custer, Tillman and Okfuskee Counties. (Okla. Coop. Sur.). ARKANSAS - No positive specimens recovered from either gin trash or lint cleaner inspections. (Frazier).

BOLL WEEVIL (Anthonomus grandis) - TEXAS - Survey in El Paso area negative; infestations found in 4 Howard County fields and in several cotton stubble fields near Presidio. (PPC South. Reg., Oct. Rpt.).

BOLL WEEVIL COMPLEX (Anthonomus grandis complex) - ARIZONA - None observed in 1965-infested fields. CALIFORNIA - None taken from gin trash collections in Bard Valley. (PPC West. Reg., Oct. Rpt.).

A WHITE-FRINGED BEETLE (Graphognathus leucoloma striatus) - KENTUCKY - Collected at Hopkinsville, Christian County. New county record. Survey negative in McCracken and Graves Counties. (PPC Cent. Reg., Oct. Rpt.). SOUTH CAROLINA - Collected in Georgetown County. New county record. (PPC South. Reg., Oct. Rpt.).

CARIBBEAN FRUIT FLY (Anastrepha suspensa) - FLORIDA - Few larvae collected in carissa at Vero Beach, Indian River County, and in calamondin at St. Petersburg, Pinellas County. Adults trapped at Cortez, Manatee County; Lake Wales, Polk County; and Vero Beach. (Kendrick et al.).

IMPORTED FIRE ANT (Solenopsis saevissima richteri) - Small extensions detected in Alabama, Arkansas, Florida, Georgia, Mississippi, North Carolina and Texas. (PPC South. Reg., Oct. Rpt.).

GRASSHOPPERS - UTAH - Late-fall populations below normal in northern and central areas. (Knowlton).

HAWAII INSECT REPORT

Insects of Regional Significance - All stages of ORIENTAL FRUIT FLY (Dacus dorsalis) heavy in 0.25 acre of citrus in Wailuku, Maui. Nearly mature fruits 80 percent infested. (Takishita). All stages of MELON FLY (Dacus cucurbitae) light to medium in 1 acre of cucumbers in Hauula, Oahu. (Sato). An adult female GRASSHOPPER (Schistocerca vaga) collected on island of Kauai, November 8, 1966, on bean plant in Eleele. This is second specimen caught on Kauai. (Au). GREENHOUSE WHITEFLY (Trialeurodes vaporariorum) and LEAF MINER FLIES (Liriomyza spp.) medium to heavy on eggplant, beans, cucumber, and tomato throughout Waialua and Waianae, Oahu. Increased after heavy rains; wet fields hampered spray operations. (Yamamoto).

Beans - A PYRALID MOTH (Maruca testulalis) and BEAN BUTTERFLY (Lampides boeticus) larvae infesting hyacinth-bean and lima bean in Ewa, Oahu. (Hironaka, Funasaki).

Fruits - BARNACLE SCALE (Ceroplastes cirripediformis) continues heavy in 200 acres of passion-fruit at Kahului, Maui. (Miyahira). CARMINE SPIDER MITE (Tetranychus telarius) heavily damaged 3 acres of passion-fruit in Haiku, Maui. Dead vines evident. (Miyahira).

Ornamentals - COWPEA APHID (Aphis craccivora) heavy on nanea (Vigna marina), a beach legume, in Moloaa, Kauai. (Au).

Miscellaneous Pests - Continuous wet weather caused heavy activity by GIANT AFRICAN SNAIL (Achatina fulica) on Maui and Oahu. Large numbers reported in Hana, Wailuku and Kihei, on Maui. On Oahu, medium to heavy populations reported from windward area. Snails caused light damage in 0.50 acre of eggplant in Hauula, Oahu. (Miyahira, Funasaki, Sato).

INSECT DETECTION

New State Records

ALFALFA WEEVIL (Hypera postica) - WISCONSIN - Collected from alfalfa at Tobin, Kenosha County, November 15, 1966, by M. S. Conrad and O. L. Lovett. Det. R. E. Warner. (p. 1079).

WOOLLY WHITEFLY (Aleurothrixus floccosus) - CALIFORNIA - Collected from citrus at San Diego, San Diego County, by J. H. Rosenberger November 9, 1966. Det. R. F. Wilkey. (p. 1081).

New County Records

BLUEGRASS BILLBUG (Sphenophorus parvulus) - NEBRASKA - Collected from bluegrass in Lincoln, Lancaster County, during summer. (p. 1079).

ALFALFA WEEVIL (Hypera postica) - MICHIGAN - Collected from alfalfa in Branch County, November 17, 1966. (p. 1079).

OLIVE SCALE (Parlatoria oleae) - CALIFORNIA - Collected on olive at Redding, Shasta County. (p. 1082).

A WHITE-FRINGED BEETLE (Graphognathus leucoloma striatus) - KENTUCKY - Collected at Hopkinsville, Christian County. SOUTH CAROLINA - Collected in Georgetown County. (p. 1084).

CORRECTIONS

CEIR 16(45):1052 - A BRUCHID (Bruchus astronotatus) should read "...at Kiolakaa, Kau District, about 30 miles from Hookena. (Davis)."

LIGHT TRAP COLLECTIONS

	Tempera-ture °F.	Precip-itation (inches)	Type of trap BL = blacklight I = incandescent MV = mercury vapor O = other	Agrotis ipsilon (black cutworm)	Carpocapsa pomonella (codling moth)	Chorizagrotis auxiliaris (army cutworm)	Estigmene acrea (salt-marsh caterpillar)	Faronta diffusa (wheat head armyworm)	Feltia subterranea (granulate cutworm)	Heliothis virescens (tobacco budworm)	H. zea (bollworm, corn earworm, tomato fruitworm)	Loxostege commixtalis (alfalfa webworm)	Loxostege similalis (garden webworm)	Loxostege sticticalis (beet webworm)	Manduca quinquemaculata (tomato hornworm)	Manduca sexta (tobacco hornworm)	Ostrinia nubilalis (European corn borer)	Peridroma saucia (variegated cutworm)	Prodenia ornithogalli (yellow-striped armyworm)	Pseudaletia unipuncta (armyworm)	Spodoptera exigua (beet armyworm)	Spodoptera frugiperda (fall armyworm)	Trichoplusia ni (cabbage looper)	Crops
FLORIDA																								
Gainesville 11/15-17				13					7		2									17		2		
GEORGIA																								
Tifton 11/10-16	35-79	2.18	BL								20													
SOUTH CAROLINA																								
Charleston 11/7-13	49-84	None	BL	20					12		5								2	50				
TENNESSEE																								
Maury 11/1-7				11					3		12							1		28				
Robertson 11/1-7				3					1		4									20		1		
Cumberland 11/1-7				12							1							1		14				
TEXAS																								
Waco 11/12-18			BL	6					44	1	4							57	2	609	18	38	3	
Brownsville 11/12-18	55-86	Trace	2BL	71			12		77	6	1					2		61	35	286	109	237	41	

Formosan Subterranean Termite

Guidelines for Survey

Background

Formosan subterranean termite, Coptotermes formosanus, was first found in continental United States July 1965 in a shipyard warehouse at Houston, Texas. An eradication treatment was applied against this infestation and it is believed that the pest had been eliminated. New infestations were found, however, in May and June 1966 in the port area of New Orleans and at Lake Charles, Louisiana. New infestations were found, also, in the Houston shipyard and in a shipyard at Galveston, Texas. Total sites known to be infested as of June 30 were as follows: New Orleans 16, Lake Charles area 6, Houston 2, and Galveston 1. Damage has been severe in many of the infested structures. The infestations in Lake Charles, Louisiana, area were found principally in dead trees and stumps in a swampy woodland estimated to cover 3,000 acres. Since three shipyards have been found infested and the focal point of the infestations in New Orleans centers on Camp Leroy Johnson, a World War II Transportation Corps installation near Lake Pontchartrain, it appears that the pest may have been introduced through marine equipment or cargo which had been infested and returned from overseas. Many of the buildings on this site have been dismantled and removed from the property.

Formosan subterranean termite has been known in China, Guam, Hawaii, Japan, Philippines, South Africa, and Taiwan for many years where its damage to various structures has been a serious problem. Introduced into Hawaii around 1900, it is one of the Islands' most serious pests, causing 2 to 3 million dollars damage annually in Honolulu alone.

Geographical extent of survey

The gulf coast, the west coast, the Atlantic coast to Philadelphia and the Mississippi River to Memphis. All other inland waterways receiving material or equipment from Asia or the known infested areas of Louisiana and Texas should receive attention; also, any site in the United States where material suspected to be harboring the termite has been received.

Survey through cooperator assistance

1. Contact commercial pest control operators, military pest control officers, county agents, and others involved with pest control. Examine any termite specimens on hand. Encourage them to submit specimens and to cooperate in the program.

2. Work closely with plant quarantine inspectors at ports and follow up leads supplied by them.

3. Contact power and telephone companies to determine if termite damage has been seen on poles. Severe damage to treated poles has been found in Louisiana.

Principal locations to be surveyed

1. Air and water ports, especially those serving countries or States infested with the termite. In or near loading areas, inspect piers, structures, pilings, logs, utility poles, and other timber in contact with the soil.

2. Military bases and business establishments receiving material from infested areas. Give attention to warehouses, storage areas, and dumps containing wooden debris.

3. Old military camps.

4. Wrecking company storage areas and lumber companies.

5. Any other location including private homes suspected of having a termite infestation.

Structures and materials to be inspected

Check all types of structures, piers, pilings, old boats and barges, posts, logs, utility poles and other timber in contact with soil. Give special attention to warehouses, storage areas, buildings under repair and dumps containing wooden debris.

What to look for

1. Watch for flights of the reproductives in the spring. There may be fall swarms in the warmer and more humid areas. Special attention should be given to picture windows in homes, service stations, street lights, and other well-lighted areas. Light traps may be useful for detection of the winged forms. Surveillance for winged forms is the most practical and economical method of survey for this pest.

2. Cobwebs, window sills and any other areas around lights that may collect debris should be closely examined for presence of winged forms or shed wings of termites. This is perhaps the best method to determine rapidly if there is a Formosan termite infestation in the area. Wings may not be evident several months after the flight season, however.

3. In structures check inside and out for tunneling that breaks through the wall surface. Also watch for clusters of tunnels on the walls, in and around door and window frames, and along adjoining areas of asbestos siding. Tap the walls, baseboards, floors, etc. A hollow sound or soft surface suggests an infestation. Check for tunnels and other evidence of infestation underneath structures.

4. On wood products or debris, tunnels or damage may or may not be evident; therefore it would be well to probe or to cut into interior of selected samples for evidence of infestation.

Instructions for inspection of special structures

1. Concrete slab construction

    a. Check for evidence of attack at or near any plumbing through the slab. Entry around bathtub plumbing is common.

    b. Look for earthen shelter tubes around baseboards.

    c. Tap baseboards and around walls.

    d. Check on side of foundation for earthen shelter tubes.

    e. Check for wood that extends into or through the slab, such as door frames.

2. Structures on piers or other types of raised foundations

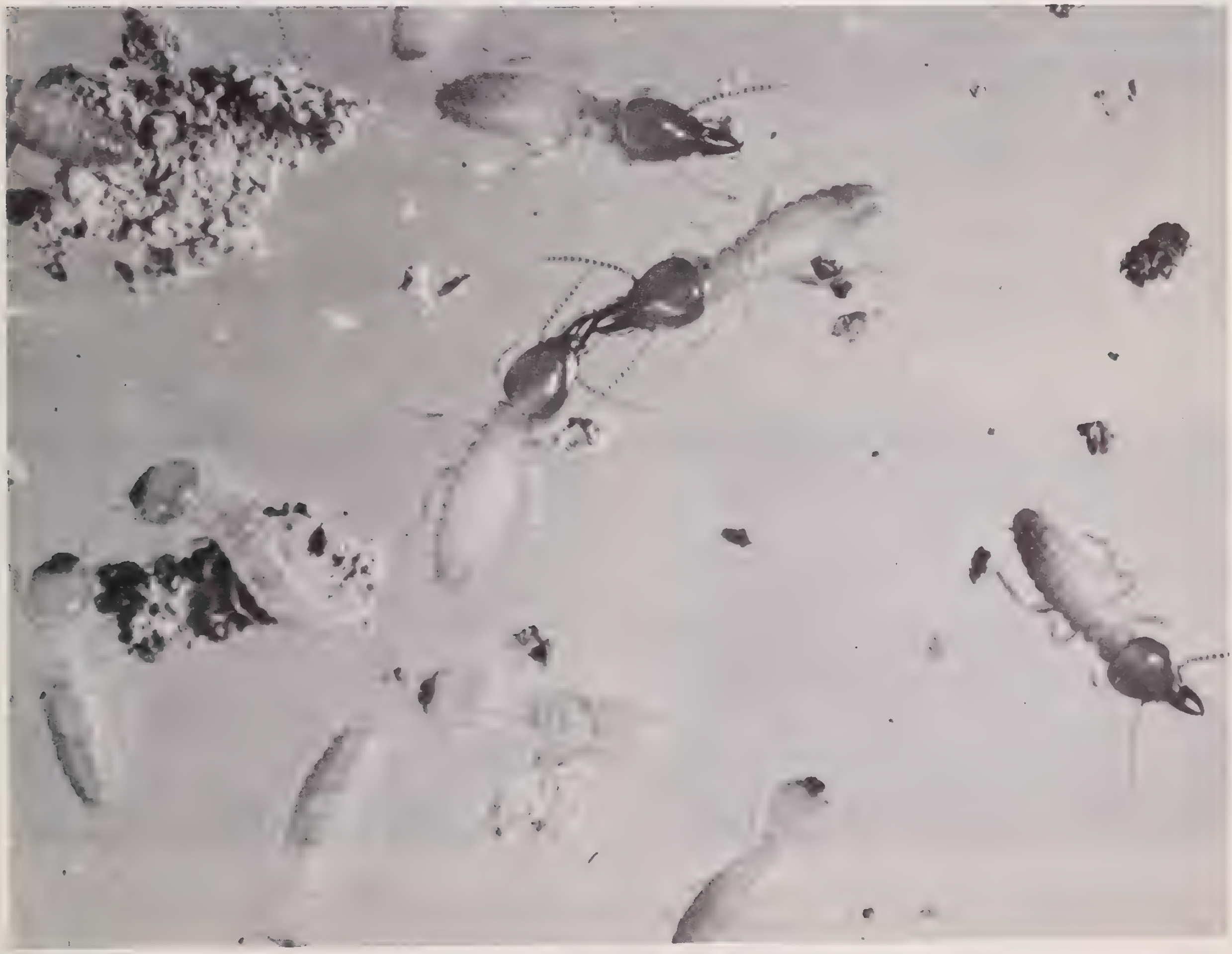
    a. Check for earthen shelter tubes on the foundation and on ceilings and joists. Pay particular attention to areas where the soil is moist, in corners, and areas poorly ventilated. Hidden entrances through the bases of chimneys and through hollow brick foundations are common.

Submission of specimens

Examine all termite specimens collected. Sort out those suspected to be Coptotermes formosanus and send them in for determination. The key on pages 1091-1098 will aid in screening specimens. Winged forms or soldiers are needed for positive identification. Plant Pest Control Division employees should follow instructions in the survey manual for preparation and submission of specimens. If cooperators have a standard identification form available, this may be used to submit specimens. When forms are not available, send the following information with the specimens: State, county, city, name and address of property, type of property, degree of infestation, name and address of collector, date of collection. All specimens should be preserved in alcohol. Although 70 percent alcohol is preferred, common rubbing alcohol will suffice. Submit at least 10 specimens if available. Send suspect specimens to:

C. C. Fancher
Plant Pest Control Division
P. O. Box 989
Gulfport, Mississippi 39501

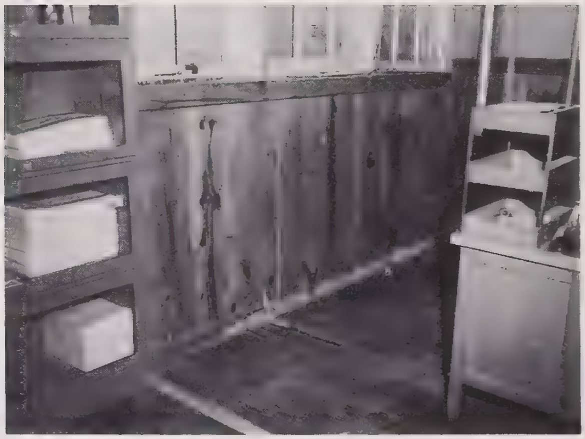
(Compiled in Survey and Detection from information supplied by PPC Southern Region personnel and U. S. Forest Service.)



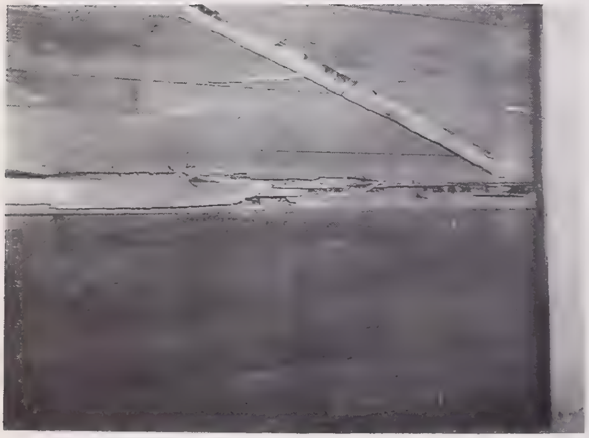
Soldiers and workers. The two soldiers locking pinchers is a common occurrence. (Photo by A. A. LaPlante, Hawaii Ext. Serv.).

DAMAGE BY FORMOSAN SUBTERRANEAN TERMITE

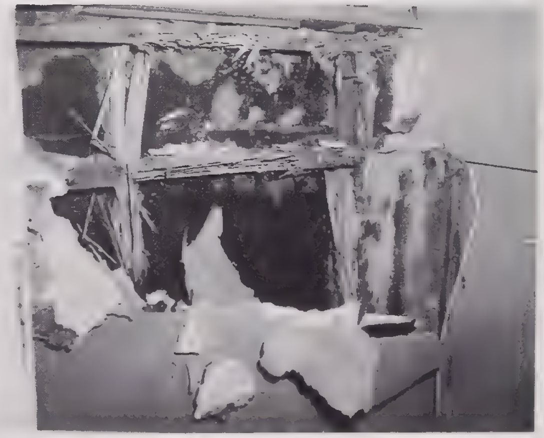
Note tunnels around
window frame



Damage to floor and
base of cabinet



Damage to flooring



Damage to structural timbers
(Wallboard removed to expose damage)

USDA Photographs

USDA Coop. Econ. Ins. Rpt.
16(47):1087-1090, 1966

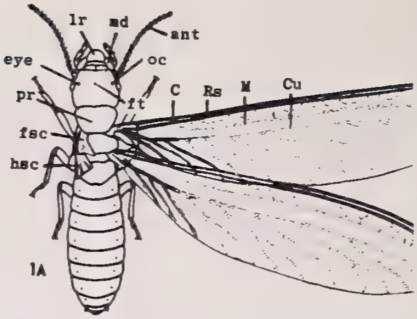
Key to Eight Termite Genera

Kalotermes, *Incisitermes*, *Cryptotermes*, *Zootermopsis*, *Heterotermes*, *Reticulitermes*, *Coptotermes*, and *Amitermes*

Kumar Krishna
Department of Entomology
American Museum of Natural History
New York

The following keys have been prepared as aids for recognition of *Coptotermes formosanus* Shiraki. This species will key out to *Coptotermes* while all other indigenous or already established species known to occur in the United States will key out to one or another of the seven remaining genera. Separate illustrated keys are provided for the imago and soldier castes. No key is provided for workers, as members of this caste are difficult to identify generically; however, as the mandible dentition of workers is almost the same as that of the imagoes, this character can, in some cases, be used to identify subfamilies and genera. The dentition characters noted in the *Key Based on the Imago Caste* (See Figs. 3A-H) may, therefore, be helpful but must be used with caution as dentition in the imago castes of several genera is nearly identical.

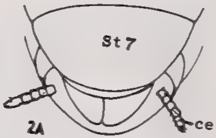
Key Based on the Imago Caste



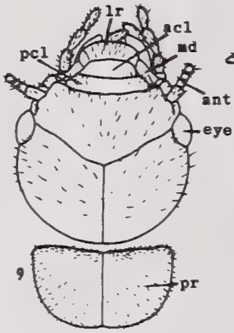
1A

Note: Mandibles must be exposed for examination.

1. Ocelli (oc) present, antennae less than 24 joints (Fig. 1A); cerci (ce) two-jointed (Fig. 2B)..2



2A



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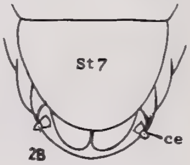
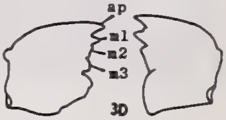
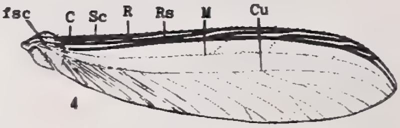


2B

Ocelli absent, antennae 24-jointed (Fig. 9); cerci (ce) four-eight jointed (Fig. 2A); mandible dentition as in(Fig. 3D)................. ....Zootermopsis



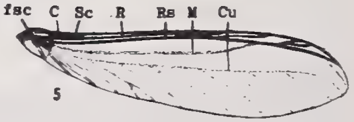
3D



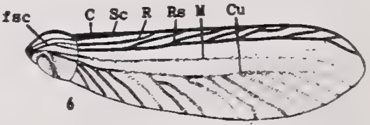
4

2. Forewing radial sector vein (Rs) with branches (Figs. 4, 5, 6)..............................3

Forewing radial sector vein (Rs) without branches (Fig. 1B)..........................5

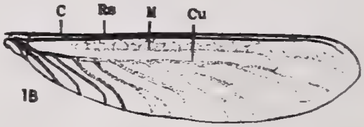


5



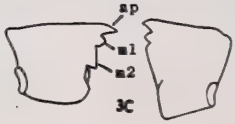
6

3. Forewing median vein (M) joining radial sector (Rs) (Fig. 5); mandible dentition as in(Fig. 3C) ....Cryptotermes



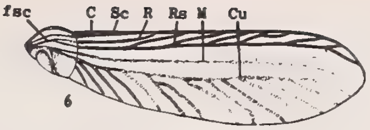
1B

Forewing median vein (M) running between radial sector (Rs) and cubitus (Cu), not joining radial sector..4



3C

4. Forewing broad between radial sector (Rs) and costa (C) (Fig. 6); left mandible with posterior margin of first marginal tooth (m_1) equal to anterior margin of second marginal tooth (m_2) (Fig. 3A)...Kalotermes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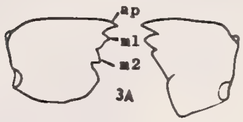
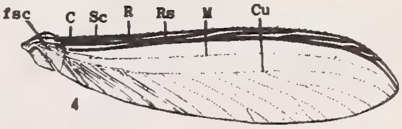
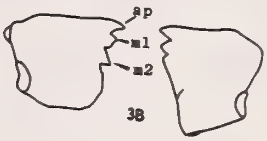
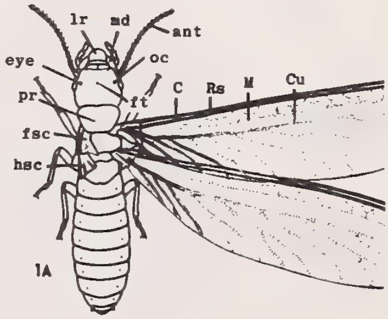

3A

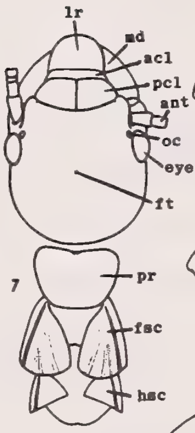

4

Forewing narrow between radial sector (Rs) and costa (C) (Fig. 4); left mandible with posterior margin of first marginal tooth (m_1) shorter than anterior margin of second marginal tooth (m_2) (Fig. 3B)..Incisitermes


3B


1A

5. Left mandible with three marginal teeth (m_1, m_2, m_3), right mandible with subsidiary tooth (sub) (Figs. 3E, 3F, 3G); forewing scale (fsc) large and partially covering hind wing scale (hsc) (Figs. 1A, 7)..........................6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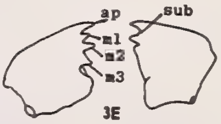
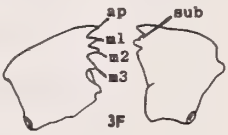
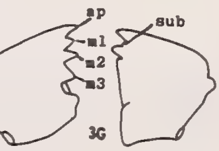
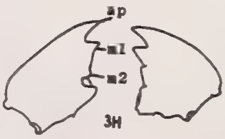

3E

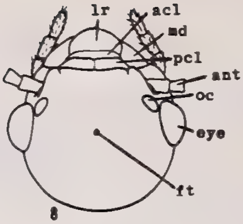

3F


3G

Left mandible with two marginal teeth (m_1, m_2), right mandible without subsidiary tooth (Fig. 3H); forewing scale small and not overlapping hind wing scale...Amitermes

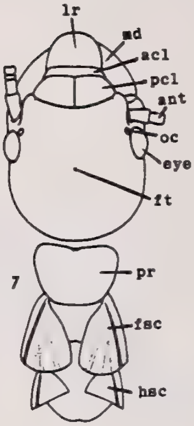

3H

6. Head round, ocelli (oc) large and well developed (Fig. 8); wing membrane with many minute hairs...Coptotermes



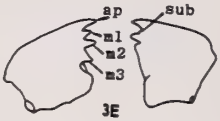
8

Sides of head parallel, ocelli (oc) small (Fig. 7); wing membrane without hairs..............7

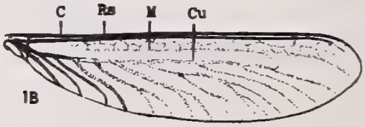


7

7. Anterior costal margin (C) of forewing with definite row of small, fine hairs; second marginal tooth (m_2) of left mandible distinctly longer than first marginal tooth (m_1) (Fig. 3E)...Heterotermes

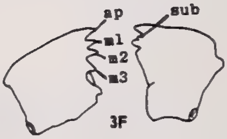


3E



1B

Anterior costal margin (C) of forewing with sparse or no hairs (Fig. 1B); second marginal tooth (m_2) of left mandible about same length as first marginal tooth (m_1) (Fig. 3F)...Reticulitermes



3F

Key Based on the Soldier Caste

1. Antennae with at least 23 joints (Fig. 17); cerci long and four-five jointed... Zootermopsis

Antennae with fewer than 23 joints; cerci short and two-jointed............................ 2

2. Head short, truncated in front, mandibles comparatively short (Fig. 12A).. Cryptotermes

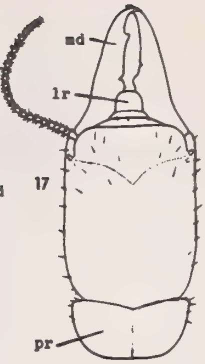
Head long and narrow, not truncated in front.. 3

3. Head without a fontanelle (Figs. 10, 11A, 11B) 4

Head with a fontanelle (ft) (Figs. 13A, 14, 15, 16A).. 5

4. Pronotum (pr) with anterior margin deeply incised and angular (Figs. 11A, 11B)..................................... Incisitermes

Pronotum (pr) with anterior margin concave (Fig. 10).. Kalotermes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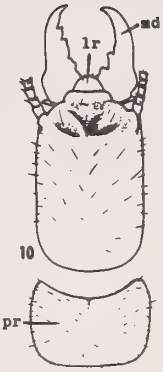
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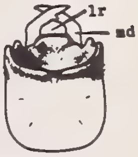
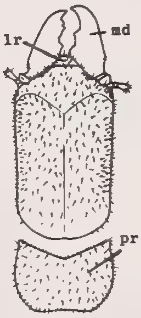
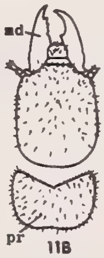
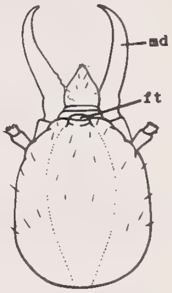
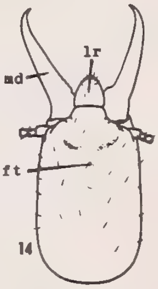

12A


11A


11B


13A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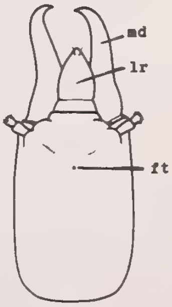
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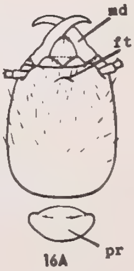
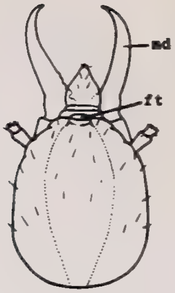

16A

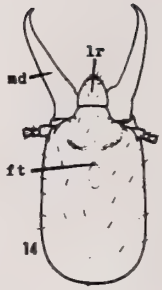
5. Fontanelle (ft) large and tubular (Fig. 13A)... ....Coptotermes

Fontanelle (ft) not large and tubular, sometimes very small, circular, and distinct....... 6



13A

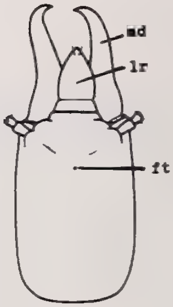
6. Head long and narrow, mandibles (md) without prominent tooth, basal inner margin of left mandible with serrations, fontanelle (ft) small and circular, pronotum flat (Figs. 14, 15)..... 7



14

7. Mandibles (md) long, slender, and curved slightly inward at tips (Fig. 14).................... ....Heterotermes

Mandibles (md) short, thick, and hooked at tips (Fig. 15)................................... ....Reticulitermes



15

Abbreviations Used in Figures

acl -- anteclypeus
ant -- antennae
ap -- apical tooth
C -- costa vein or costal margin
ce -- cerci
Cu -- cubitus vein
fsc -- forewing scale
ft -- fontanelle
hsc -- hind wing scale
lr -- labrum
M -- median vein
m_1 -- first marginal tooth
m_2 -- second marginal tooth
m_3 -- third marginal tooth
md -- mandible
oc -- ocellus
pcl -- postclypeus
pr -- pronotum
R -- radius vein
Rs -- radial sector vein
Sc -- subcosta vein
St -- sternite
sub -- subsidiary tooth
t -- tooth

Captions for Figures

Fig. 1A. Imago of *Reticulitermes flavipes* (Kollar) with wings spread out (dorsal view). B. Forewing of same species.

Fig. 2A. Ventral tip of abdomen of female of *Zootermopsis nevadensis* (Hagen), showing five-jointed cerci. B. Ventral tip of abdomen of female of *Kalotermes approximatus* Snyder, showing two-jointed cerci.

Fig. 3. Imago mandibles of A. *Kalotermes flavicollis* (Fabricius)
B. *Incisitermes schwarzi* (Banks)
C. *Cryptotermes cavifrons* Banks
D. *Zootermopsis angusticollis* (Hagen)
E. *Heterotermes aureus* (Snyder)
F. *Reticulitermes flavipes* (Kollar)
G. *Coptotermes formosanus* Shiraki
H. *Amitermes wheeleri* (Desneux)

Fig. 4. Forewing of *Incisitermes schwarzi* (Banks).

Fig. 5. Forewing of *Cryptotermes cavifrons* Banks.

Fig. 6. Forewing of *Kalotermes approximatus* Snyder.

Fig. 7. Head and thorax of imago of *Heterotermes aureus* (Snyder) (dorsal view).

Fig. 8. Head of imago of *Coptotermes formosanus* Shiraki (dorsal view).

Fig. 9. Head of imago of *Zootermopsis angusticollis* (Hagen) (dorsal view).

Fig. 10. Head of soldier of *Kalotermes approximatus* Snyder (dorsal view).

Fig. 11A. Head and pronotum of large soldier of *Incisitermes schwarzi* (Banks) (dorsal view). B. Head and pronotum of small soldier of *Incisitermes schwarzi* (Banks) (dorsal view).

Fig. 12. Head of soldier of *Cryptotermes cavifrons* Banks. A. Dorsal view. B. Side view.

Fig. 13. Head of soldier of *Coptotermes formosanus* Shiraki. A. Dorsal view.

B. Side view.

Fig. 14. Head of soldier of *Heterotermes aureus* (Snyder) (dorsal view).

Fig. 15. Head of soldier of *Reticulitermes flavipes* (Kollar) (dorsal view).

Fig. 16. Soldier of *Amitermes wheeleri* (Desneux). A. Head and pronotum (dorsal view). B. Head (side view). C. Mandibles.

Fig. 17. Head and pronotum of soldier of *Zootermopsis nevadensis* (Hagen) (dorsal view).

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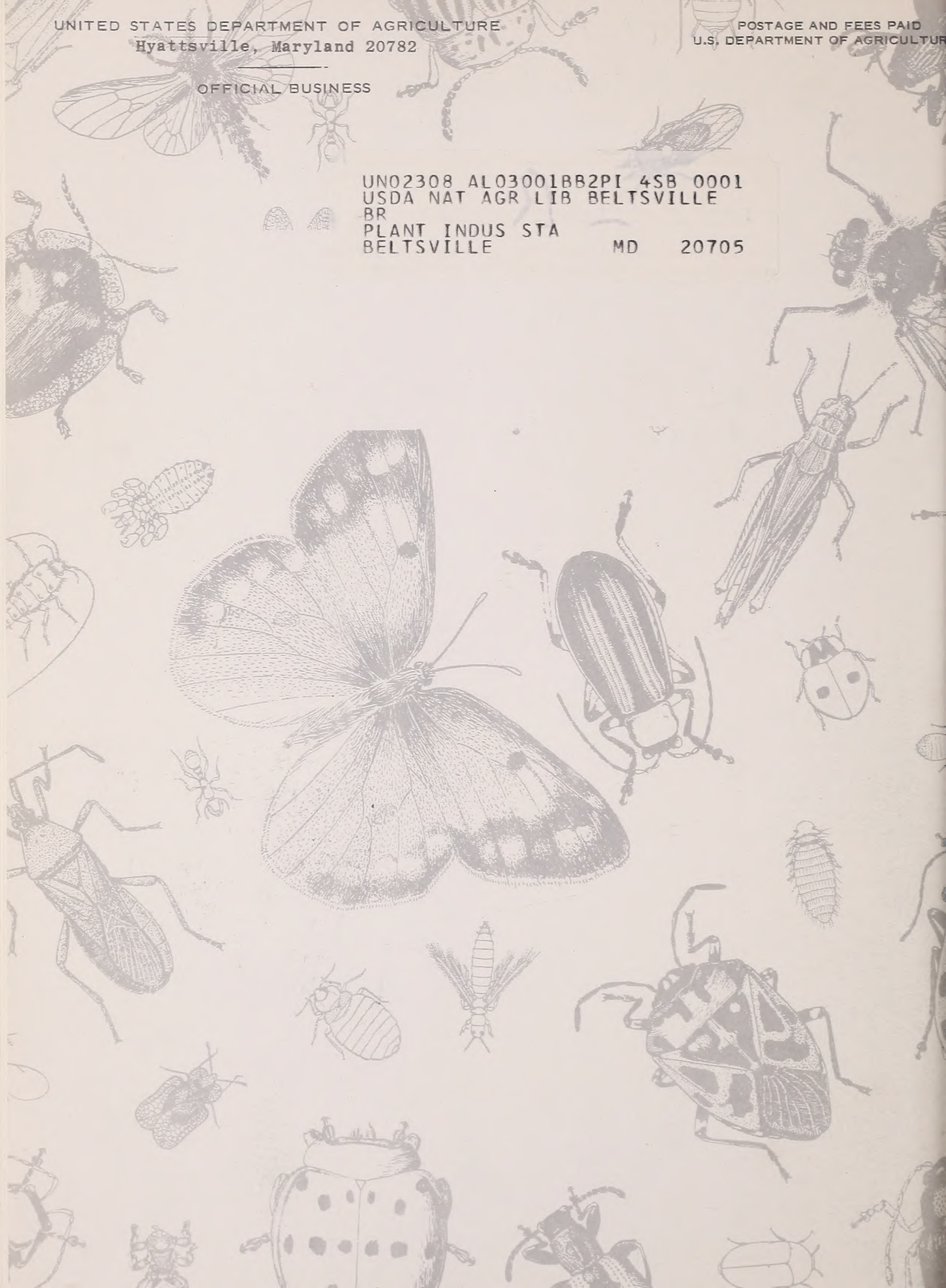

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